



Joint Warfare System (JWARS)


Fielding Plan

Version 1.2

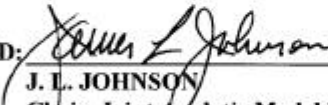
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**JWARS Fielding Plan
Approval Sheet**

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FOREWORD

J-8/Studies and Analysis Management Division (SAMD) is leading the fielding of JWARS for the JWARS community. Cutoff date for incorporation of information used to develop this plan is 30 November 1998. This publication is a living document and will be updated as necessary.

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1. INTRODUCTION

This section provides contextual information that relates this plan to the development of the Joint Warfare System (JWARS) and other JWARS plans.

1.1 Purpose of this Document. This document identifies actions and assigns responsibilities to organizations necessary to field JWARS through full operational capability (FOC), Version 3. The initial focus is on the achievement of limited and full initial operational capability (IOC), Versions 1 and 2 respectively, and includes discussion of the Alpha Version, Version 0.5. Organizations and their responsibilities are discussed in Section 2. Actions and timelines associated with JWARS fielding events are discussed in Section 3. General transition planning considerations are discussed in Section 4. Installation and user actions are addressed in Section 5. An overview of JWARS security considerations is provided in Section 6.

1.2 Scope of this Document. This document covers the following aspects of fielding the JWARS software:

- User-site planning (e.g., hardware configuration, support software, database, funding, personnel, etc.);
- Installation planning for test sites and operational user sites;
- User training;
- Transition planning by users with legacy systems;
- Installation schedule.

1.3 Joint Warfare System (JWARS) Overview. JWARS will be a state-of-the-art, constructive simulation that will provide a multi-sided and balanced representation of joint warfare. The JWARS simulation will consider all levels of war (i.e., strategic, operational, and tactical) but will focus on the operational level. The representations of Command, Control, Communications, Computers (C4) and Intelligence Surveillance Reconnaissance (ISR) will form the foundation for how objects perceive and interact with one another in JWARS. JWARS will maintain ground truth and current perceptions for each side. The ability of a side to make and execute informed decisions will be directly attributable to that side's perceptions of the battlefield.

JWARS will be sufficiently flexible to deal with current, near-term, and future warfare concepts, doctrine, systems, and organizations of the United States, its allies, and potential adversaries. JWARS will assist implementation of Joint Vision (JV) 2010 by providing a vehicle to assess current and future military capabilities within the following four emerging operational concepts:

- Dominant maneuver;
- Precision engagement;
- Focused logistics;
- Full-dimensional protection.

JWARS will satisfy the requirements as specified in the JWARS Operational Requirements Document (ORD), reference (d). JWARS will support four key uses when FOC is achieved. Anticipated functionality is listed below by version:

- Version 0.5 (Alpha Version). The Alpha Version is the first, and only version that is planned to be available for Alpha testing. This version will have multiple conceptual modules provided by the developer and will include: primitive environment objects, limited exercise control, limited text output on situation and status reports, limited interaction between objects, and limited ability to exercise JWARS architecture. This version is planned for release to testers for the primary purpose of providing early feedback to the JWARS developer. This version is not required by the ORD.
- Version 1 (Limited IOC). Version 1 shall include C4, ISR, logistics capabilities, and essential functionality that exist in the current MIDAS and TACWAR simulations. Version 1 shall be capable of replacing the use of TACWAR to support the Force Assessment application at Appendix A of the ORD. Additional warfare functionality as described at Appendix C of the ORD.
- Version 2 (Full IOC) shall provide balanced warfare representation to include C4, ISR, and logistics and shall be capable of supporting the Planning and Execution and Force Assessment applications. JWARS shall be capable of replacing the legacy campaign models TACWAR and MIDAS. Additional warfare functionality as described at Appendix C of the ORD.
- Version 3 (FOC) shall provide balanced warfare representation to include C4, ISR, and logistics and shall be capable of supporting the following applications: Planning and Execution, Force Assessment, System Effectiveness and Trade-off Analysis, and Concept and Doctrine Development. In addition JWARS shall be capable of replacing the following legacy campaign models: Concepts Evaluation Model (CEM), THUNDER, Integrated Theater Evaluation Model (ITEM), and the Scenario Unrestricted Mobility Model for Intra-Theater Simulation (SUMMITS). JWARS shall provide the functionality described by the tasks listed at Appendix B.

JWARS will conform to the High Level Architecture (HLA), a common technical framework defined under the leadership of the Executive Council for Modeling and Simulation (EXCIMS).

JWARS is not intended to be interactive (i.e., support users acting as participants within the simulation during execution), support real-time mission execution, or be linked directly to real world Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems. It shall be able to use real world C4 and ISR systems to support update, processing, analysis, and transmission of JWARS input and output data.

The potential users of JWARS include the Joint Staff, the Combatant Commands, the Services, Office of the Secretary of Defense (OSD), Joint Task Force (JTF) Commanders/Staffs, and selected other Department of Defense (DoD) organizations.

1.4 Relationship to Other Plans. This plan is just one of several plans dealing with JWARS. Other plans of interest in fielding JWARS are identified in Table 1-1, along with each plan's proponent, content, and relationship to this fielding plan.

Table 1-1. Relationship of Fielding Plan to Other Plans

Plan	Proponent	Description	Relationship to Fielding Plan
JWARS Configuration Management Plan (Version 1.5, 25 November 1998)	Director, Force Structure, Resources, and Assessment, Joint Staff, J-8	Provides a formal plan for orderly, systematic management and control of JWARS software and associated documentation	Describes the approach for life cycle-management of the JWARS configuration, including participating organizations, responsibilities, change control procedures, and distribution of software
JWARS Training Plan (estimated publication date December 1998)	J-8/Studies and Analysis Management Division (SAMDM), JWARS Office	Provides a syllabus and schedule for training; prescribes the prerequisites for the course; identifies the organization that will furnish instructors	Describes the training to be provided to user site personnel
JWARS Management Plan (26 Aug 1996)	JWARS Office	Provides the history of the program, management perspective, and technical approach	Describes technical approach; identifies program participants; provides macro-level schedule; identifies tentative test sites
JWARS Test and Evaluation Plan (Estimated publication date: December 1998)	JWARS Office	Describes the procedures to be followed during alpha, beta, and operational testing; identifies the various platform configurations on which the test will be conducted; details how key performance parameters (KPPs) from the ORD will be evaluated and measured.	Provides a detailed plan for alpha, beta and operational testing; documents the process for testing and evaluating JWARS for conformance to the KPPs
Verification, and Validation (V&V) Plan (Version 3.0, 13 August 1998)	Verification and Validation (V&V) Agent, Joint Data Support (JDS)	Provides a generic overview of V&V and the essential elements required to support a V&V effort; addresses production versions of JWARS and issues related to V&V.	Serves to document the process for verifying and validating JWARS software and data before fielding
Joint Warfare System (JWARS) Alpha Installation Plan and Procedures (Version 0.9, draft, 15 November 1998)	JWARS Office	Provides installation and training schedule, site installation checklists, hardware and support software needed for the Alpha Version, and software installation procedures	Provides detailed planning guidance for installation and training for the Alpha Version
Automated Data Processing (ADP) Security Plan (Estimated publication date: TBD)	JWARS Office	Provides procedures for controlling, protecting, and providing security for JWARS	Serves to document security requirements
Legacy Simulation Transition Plan (As required)	Individual Organizations	Describes an organization's plan for transition from legacy simulations to JWARS	Provides orderly transition planning

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2. ORGANIZATION AND RESPONSIBILITIES

This section identifies the organizations involved in fielding JWARS and describes their respective responsibilities.

2.1 Organizations, Roles, and Responsibilities. The partnership for fielding JWARS is portrayed in Figure 2-1.

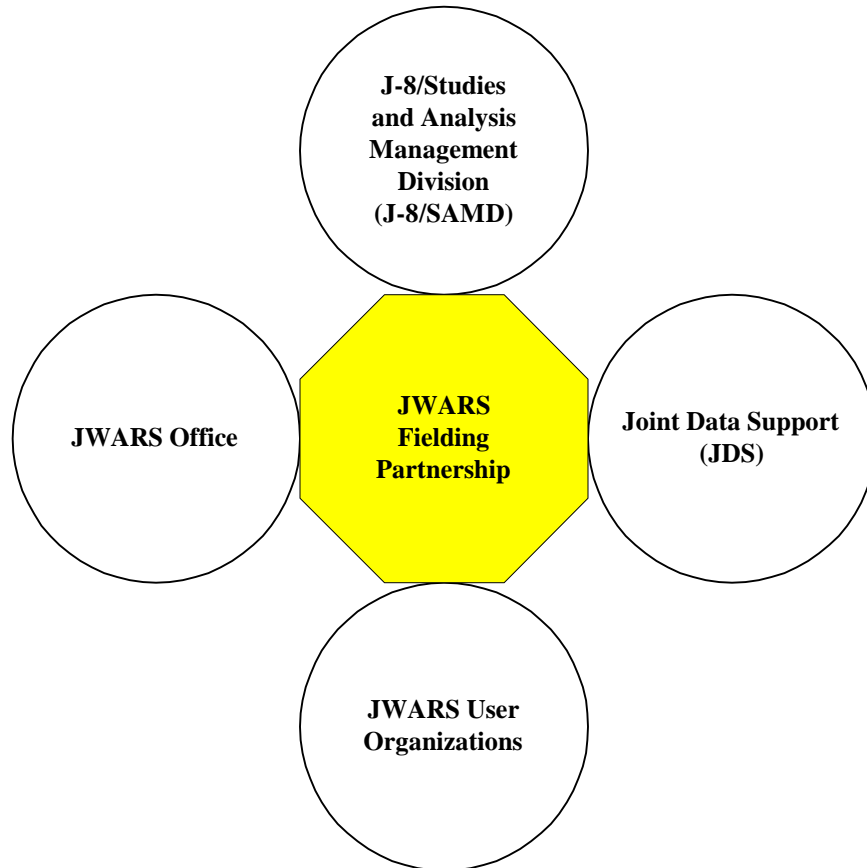


Figure 2-1. JWARS Fielding Partnership

The organizations involved in fielding JWARS are described below. Table 2-1 summarizes the roles and responsibilities for fielding JWARS in the order in which they are expected to become active.

2.2 J-8/Studies and Analysis Management Division (SAMD). J-8/SAMD has responsibility for fielding JWARS, including developing this fielding plan; providing guidance on activities relating to fielding; coordinating the installation of JWARS software at user sites (within resource limitations); coordinating training programs and providing user training (as agreed upon with the JWARS Office), and administering configuration management. Commencing with the release of

the operational Version 1.0, J-8/SAMD will lead the installation of JWARS software and user training for operational (non-test) user sites. Assisting J-8/SAMD in configuration management will be the JWARS Configuration Management (CM) Administrator. The CM Administrator will manage the JWARS CM process on behalf of the CCB. Initially, the JWARS Office will perform the CM administrator duties in accordance with the JWARS Software Project Management Plan until release of the 1.0 beta version of JWARS. When the beta version is fielded, J-8/SAMD will assume CM administrator duties in accordance with the Configuration Management Plan, reference (g). Users will have a single point of entry for CM administration matters (e.g., help desk, submission of change requests).

Table 2-1. Fielding Roles and Responsibilities of Participating Organizations

Role	Organization Responsible	Description
Software Development	Development Agent (DA)	Develop JWARS versions including documentation, source code, and object code.
JWARS Configuration Management	JWARS Office	Perform CM in partnership with J-8/SAMD
	J-8/SAMD	Write the JWARS Configuration Management (CM) plan; perform JWARS CM in partnership with JWARS Office
JWARS Program Management	JWARS Office	Identify hardware configurations supported; identify database management system; identify support software requirements
Simulation Verification, Validation & Accreditation (VV&A)	JWARS Users Subgroup (JUS), Verification and Validation (V&V) Agent, Operational Test Agent (OTA)	Perform V&V
	User Sites' Organizations	Accredit simulation for use in studies at user site
Data Certification (VV&C)	Joint Data Support (JDS) assisted by users	Obtain data; develop and provide test data, build and provide initial databases to support sites for Alpha, and Versions 1-3
	User Sites' Organizations	Certify data for use in studies at user site
Documentation (Manuals)	JWARS Office	Develop and publish JWARS user, operation, maintenance, and software technical manuals
Training (Operational User)	JWARS Office, J-8/SAMD, CM Administrator	Coordinate and arrange for training team to provide training to JWARS users; provide training materials
Funding	User Sites	Users fund acquisition of or upgrades to hardware and software
	J-8/SAMD	Provide limited Joint Analytical Support Program (JASP) funds to upgrade hardware and software for the Combatant Commands
Hardware Acquisition	User Sites	Obtain additional hardware to upgrade to minimum configuration
Support Software Acquisition	User Sites	Obtain required support software to provide proper operating environment for JWARS
Alpha Testing	JWARS Office, Test Sites	Direct efforts of test sites during alpha testing
Beta Testing	J-8, CM Administrator, Test Sites	Direct testing efforts during beta testing
Operational Testing	OTA, OPTEC System Team (OST), Test Sites	Direct and conduct operational testing
Security Accreditation	JWARS Office, User Site Organizations	Develop security accreditation procedures for JWARS software and hardware
Site Preparation	User Sites	Conduct site preparation (see Section 5.4)
Software Installation	JWARS Office, J-8/SAMD (CM Administrator), JDS	Provide installation team to install software at user sites

2.3 JWARS Office. The JWARS Office is responsible for managing JWARS software development and integration; alpha training and testing; verification and validation (V&V); and documentation activities. The JWARS Office carries out its functions through the services of the following organizations.

2.3.1 Development Agent (DA). The DA will develop versions of JWARS software including all documentation, source code, and executable code. Other support from the DA will include:

integration of developmental products from multiple developers; verification that the code runs and performs correctly in the integrated environment; preparing detailed designs; documentation, and code changes. Under the direction of the JWARS Office, the DA will lead the installation of JWARS software and user training for the test sites for the Alpha Version, Version 1 and Version 2 of JWARS. To facilitate the installation and user training, an External Support Team has been stood up with a Help Desk action line and email capability. Additionally, the JWARS User Subgroup page will have a Help Desk Section to enable tracking questions, responses, and issues. The External Support Team may be reached via phone 703-558-0289 or email jwars.helpdesk@osd.pentagon.mil.

2.3.2 Verification and Validation (V&V) Agent. The V&V Agent for JWARS is responsible for developing and maintaining the JWARS Verification and Validation (V&V) Plan and for auditing and facilitating the V&V process. To the extent possible, verification and validation requirements will be coordinated and accomplished concurrently with developmental, alpha, beta, and operational testing.

2.4 Operational Test Agent (OTA). The U.S. Army Operational Test and Evaluation Command (OPTEC) is the lead operational test activity for JWARS. OPTEC is leading an OPTEC System Team (OST) comprised of representatives from the Services' operational test activities and other subject matter experts. They will direct operational T&E as required to ensure JWARS satisfies the JWARS requirements prior to fielding of each version commencing with Version 1. They may monitor alpha testing (led by the JWARS Office) and beta testing (led by J-8/SAMD) at test sites to gather information that may contribute to satisfying requirements prior to formal operational testing. The JWARS Office will develop a Test and Evaluation Plan (TEP) along with supporting test documents.

2.5 Joint Data Support (JDS). The JDS has responsibility for providing data support to JWARS users and satisfying the JWARS requirements for data. This includes obtaining, developing, managing, verifying, validating, storing, and archiving data. In addition, JDS, in close coordination with the JWARS V&V Agent, plans, performs, and reports on verification, and validation (V&V) of the JWARS data. For the scenarios designated for alpha, beta, and operational testing, JDS will provide the test sites with a relational database that will serve as a common baseline and be sufficient to accomplish test objectives. For fielding, JDS will assist operational users sites in constructing an initial database for use at the site, provide data for studies as appropriate and will archive data selectively. Users will need to provide some data to JDS to support development of the databases and scenarios (e.g. order of battle data). JWARS user sites will be responsible for articulating data needs to JDS, responding to JDS requests for source data in accordance with memoranda of agreement, and acquiring JWARS data from the JDS repository.

2.6 JWARS User Organizations. The primary JWARS user community includes the Combatant Commands, the Joint Staff, the Services, OSD, and other DoD organizations. To ensure organization and user needs will be satisfied and allow for user involvement in the development, testing and fielding, JWARS Users Subgroups (JUS) have been formed and are

discussed in the following section. User organizations designated as test sites will have responsibilities as discussed in Section 3.

2.6.1 JWARS Users Subgroups (JUS). The JWARS Users Subgroups (JUS) are chartered by the JAMIP Steering Committee to provide user inputs to JWARS development. The subgroups cover different functional areas. JUS members are subject matter experts (SMEs) who provide functional, doctrinal, programming, modeling, and technical expertise at the theater campaign, mission, and engagement levels. The JUS are the primary source for model validation and will assist in developmental and operational testing. Additional subgroups will address specific areas of interest, provide domain expertise, and make recommendations to the JWARS Office.

Subgroups have been formed from JUS members to address specific technical issues. These subgroups are chartered to provide detailed technical expertise from the user perspective. Each subgroup has a chairperson who serves as the point of contact (POC) for the subgroup. The subgroups of particular interest to the fielding of JWARS are described in Table 2-2.

Table 2-2. Selected JWARS Users Subgroups

Subgroup	Purpose	Chair	Membership	Interest to Fielding
Configuration Management/ Fielding	Participate in the development and maintenance of the JWARS CM plan; monitor the implementation and operation of the CM process. Participate in the development and maintenance of the JWARS Fielding Plan; and execution of the plan.	J-8/SAMD	CCB Members, Users	Develops configuration management and fielding plans.
V&V and T&E WIPT	Address issues relating to V&V of the JWARS simulation and the V&V of JWARS data. Develop test and evaluation strategy and address T&E issues.	JWARS Office	V&V Agent, Service OTAs and Analysis Organizations, Test Sites, JWARS Office, JDS, J-8/SAMD, and Users	Enables user V&V of JWARS for each use; facilitates greater confidence in JWARS and results; provides test data during alpha, beta and operational testing; provides readily available data for operational use.

3. PHASING AND MILESTONES

This section identifies the events involved in fielding JWARS and the expected order of occurrence of these events.

3.1 JWARS Fielding Events. An Alpha Version of JWARS (Version 0.5), corresponding to the first 31 threads of work is planned for release to testers beginning in December 1998. This version is being released to allow users to provide early feedback to the developer. A beta release of Version 1.0, corresponding to the first 51 threads, is planned for release to testers beginning in September 1999. After completion of testing and any necessary code changes, this version will be released to the operational users as Version 1.0 (Limited IOC) by March 2000. A beta release of Version 2.0, corresponding to the first 72 threads, is planned for release to testers in September 2000. After completion of testing and any necessary code changes, this version will be released to the operational users as Version 2.0 (Full IOC) by May 2001. Interim versions between Versions 1.0 and 2.0 (greater than 51 threads, but less than 72 threads) are expected to be released for testing and use by the JWARS analytic community. The FOC version of JWARS, Version 3.0, is expected in the FY02 timeframe.

Table 3-1 lists fielding events for JWARS through Version 2.

Table 3-1. JWARS Fielding Events

Sequence Number	Approximate Date(s)	Office Responsible	Event(s)
1	Oct 97 to Nov 97	JWARS Office & J-8/SAMD	Coordinate System Architecture with future JWARS user organizations.
2	Nov 97	JWARS Office & J-8/SAMD	Propose Test Sites.
3	Jan 98 to Indefinite	J-8/SAMD	Publish minimum required hardware and support software. Update as required.
4	Feb 98	JAMIP Steering Committee	Approve System Architecture.
5	Feb 98	JAMIP Steering Committee	Approve Test Sites. Update as required.
6	Feb 98 to Mar 98	Test Sites	Identify hardware and support software to conform to initial configuration. Combatant Commands (Test Sites) submit JASP fund requests to J-8/SAMD.
7	Feb 98 to Mar 98	J-8/SAMD	Review Combatant Command (Test Sites) requests for JASP funds for hardware and support software.
8	Apr 98 to Jul 98	J-8/SAMD	Release JASP funds to Combatant Commands (Test Sites) for hardware and support software.
9	Jul 98 to Dec 98	Test Sites	Upgrade or acquire hardware and install support software (Test Sites).
10	Apr 98 to Dec 98	JWARS Office & J-8/SAMD	Develop JWARS Alpha Installation Plan and Procedures.
11	Apr 98 to Dec 98	JWARS Office & J-8/SAMD	Develop JWARS Analyst Training Course for Alpha Version.
12	Apr 98 to Sep 98	JWARS Office, J-8/SAMD, Joint Data Support (JDS), & Test Sites	Develop Memorandum of Agreement for Alpha Testing (one per Test Site).
13	Apr 98 to Dec 98	JWARS Office, OPTEC System Team (OST), & Test Sites	Develop Test and Evaluation Plan (TEP).

Sequence Number	Approximate Date(s)	Office Responsible	Event(s)
14	Sep 98 to Indefinite	JWARS Office & J-8/SAMD	Establish and maintain Help Desk.
15	Apr 98 to Dec 98	JWARS Office, JDS, Test Sites	Develop and release database and scenario for use during Alpha Testing.
16	Dec 98	JWARS Office	Dry run Analyst Alpha Training Course.
17	Dec 98 to Mar 99	JWARS Office & J-8/SAMD	Install JWARS Alpha Version of the software (Test Sites).
18	Jan 99 to Mar 99	JWARS Office, J-8/SAMD,	Conduct centralized Analyst training on Alpha Version (Test Site personnel).
19	Jan 99 to May 99	JWARS Office & Test Sites	Conduct Alpha Testing.
20	Jan 99 to Aug 99	JWARS Office, J-8, JDS, & Test Sites	Develop and release database(s) and scenario(s) for use during Beta and Operational Testing of Version 1.
21	Mar 99 to Aug 99	JWARS Office & J-8/SAMD	Develop JWARS Version 1 Installation Plan and Procedures. Update as required.
22	Mar 99 to Sep 99	JWARS & J-8/SAMD	Develop JWARS Analyst Training Courses for Version 1.
23	Mar 99 to Sep 99	JWARS & J-8/SAMD	Develop JWARS Executive Overview Course for Version 1.
24	Mar 99 to Sep 99	JWARS Office, J-8/SAMD, JDS, & Test Sites	Develop Memorandum of Agreement for Version 1 beta and operational testing (one per Test Site).
25	Apr 99 to Jan 00	JWARS Office & J-8/SAMD	Develop fielding schedule for Version 1 at Operational (non-test) Sites.
26	Feb 99 to Jul 99	JWARS Office & Test Sites	Report results and recommendations from Alpha Testing.
27	Sep 99 to Nov 99	JWARS Office, J-8/SAMD, JDS, & Test Sites	Install JWARS Version 1 software (Test Sites).
28	Sep 99 to Nov 99	JWARS Office & J-8/SAMD	Conduct centralized Analyst training on Version 1 (Test Site Personnel).
29	Sep 99 to Indefinite	JWARS Office & J-8/SAMD	Conduct Executive Overview training.
30	Sep 99 to Feb 00	JWARS Office, J-8/SAMD, OST, & Test Sites	Conduct Beta and Operational Testing of Version 1.
31	Oct 99 to Jun 01	Operational (non-test) Sites	Identify hardware and support software to conform to current configuration. Upgrade or acquire hardware and install support software. Combatant Commands (non-test) Sites identify JASP funds to J-8/SAMD.
32	Feb 00 to Aug 00	JWARS & J-8/SAMD	Develop JWARS Version 2 Installation Plan and Procedures. Update as required.
33	Mar 00 to Indefinite	JWARS Office & J-8/SAMD	Conduct centralized Analyst training on Version 1 (non-test Site Personnel).
34	Mar 00	J-8/SAMD & OST	Report results and recommendations from Beta and Operational Testing of Version 1.
35	Mar 00 to Indefinite	JWARS Office, & J-8/SAMD	Install JWARS Version 1 software at Operational (non-test) Sites.
36	Mar 00 to Aug 00	JWARS Office, J-8/SAMD, JDS & Test Sites	Develop Memorandum of Agreement for Beta and Operational Testing of Version 2 (one per Test Site).
37	Mar 00 to Aug 00	JWARS Office & J-8/SAMD	Develop JWARS Analyst Training Course for Version 2.
38	Mar 00 to Aug 00	JWARS Office & J-8/SAMD	Develop JWARS Entity Modeler, Developer, System and Database Administrator, and Executive Overview Training Courses for Version 2.
39	Mar 00 to Aug 00	JWARS Office, J-8, JDS, & Test Sites	Develop and release database(s) and scenario(s) for use during Beta and Operational Testing of Version 2.
40	Aug 00 to Oct 00	JWARS Office & J-8/SAMD	Install JWARS Version 2 software (Test Sites).
41	Aug 00 to Oct 00	JWARS & J-8/SAMD	Conduct centralized Analyst, Entity Modeler, and Developer training on Version 2 (Test Site Personnel).

Sequence Number	Approximate Date(s)	Office Responsible	Event(s)
42	Aug 00 to May 01	JWARS Office, J-8/SAMD, OST, & Test Sites	Conduct Beta and Operational Testing of Version 2.
43	Feb 01 to Indefinite	JWARS Office & J-8/SAMD	Establish recurring courses for JWARS Analyst, System Administrator, Database Administrator, Entity Modeler Developer, and Executive Overview training.
44	May 01	J-8/SAMD & OST	Report results and recommendations from Beta and Operational Testing of Version 2.
45	May 01 to Indefinite	J-8/SAMD	Field JWARS Version 2 at Operational (non-test) Sites.

Figure 3-1 graphically portrays the timeline of initial events listed in Table 3-1, aggregated according to three main functions (i.e., hardware and support software procurement, installation and training, and testing).

3.2 Version 1. The following paragraphs provide additional detail to the events listed in Table 3-1.

3.2.1 Initial Hardware Configuration. The JWARS Office and J-8/SAMD have defined a system architecture for JWARS that supports several UNIX platforms. The architecture considers the results of the platform survey conducted by J-8/SAMD in January 1997, reference (e), together with the simulation support requirements contained in the JWARS ORD, and comments received from the JWARS community in October 1997. The initial configuration is the Sun Ultra Enterprise 2/Solaris Workstation for the JWARS Alpha Version. HP and IBM platforms will be supported by the JWARS fielding of Version 2.

JWARS software will be tested and certified on all platforms identified in the system architecture. A goal for Version 3 is platform independence and will be approached through the use of open standards as appropriate. When the developer delivers the platform-independent JWARS, it will be tested and certified on a finite set of platforms within cost and schedule constraints.

The System Architecture paper outlines the JWARS client server architecture. After the Alpha Version, JWARS is being designed to utilize an NT client exclusively. Advantages of using NT clients are that JWARS input and output files can be manipulated directly on the NT client using the broader and more capable selection of office automation and personal productivity products than are available for UNIX operating environments. For more details, review the JWARS System Architecture paper on the JWARS Home Page (<https://ca.dtic.mil/j-u-g96>).

Hardware and Support Software (HW/SW) Procurement Timeline																
Event	Oct 97	Nov 97	Dec 97	Jan 98	Feb 98	Mar 98	Apr 98	May 98	Jun 98	Jul 98	Aug 98	Sep 98	Oct 98	Nov 98	Dec 98	Jan 99
Coordinate System Architecture																
Publish min HW/SW requirements																
Approve System Architecture																
Identify HW/SW (Test Sites). CINCs request \$																
J-8/SAMD reviews requests																
Funds to CINC test sites																
Upgrade or Install HW/SW at Test Sites																
Advance lead planning for HW/SW (Operational User Sites)																

Installation and Training Timeline																
Event	Oct 97	Nov 97	Dec 97	Jan 98	Feb 98	Mar 98	Apr 98	May 98	Jun 98	Jul 98	Aug 98	Sep 98	Oct 98	Nov 98	Dec 98	Jan 99
Develop Installation Plan & Procedures (Alpha Version)																
Develop Analyst Training Course (Alpha Version)																
Establish and maintain Help Desk																
Create Alpha Version data files																
Dry-run Training Course (Alpha Version)																
Install Alpha Version																
Conduct Centralized Training (Alpha Version)																
Develop Installation Plan & Procedures (Version 1)																
Develop databases and scenarios (Version 1)																
Develop Analyst Training Courses (Version 1)																
Develop Executive Overview Course (Version 1)																

Testing Timeline																
Event	Oct 97	Nov 97	Dec 97	Jan 98	Feb 98	Mar 98	Apr 98	May 98	Jun 98	Jul 98	Aug 98	Sep 98	Oct 98	Nov 98	Dec 98	Jan 99
Propose Test Sites																
Approve Test Sites																
Develop Testing MOAs (Alpha Version)																
Develop Test and Evaluation Plan																
Conduct Alpha Testing																
Report Alpha Testing Results																
Develop Testing MOAs (Version 1)																

Figure 3-1. Timelines for JWARS Fielding Events

Sites participating in testing will utilize hardware and software that conform to the system architecture. The JWARS Office plans to supersede the Systems Architecture paper with the JWARS Hardware and Software Specifications Document, reference (r), to be published in January 1999.

Changes to the initial configuration will be controlled in accordance with the JWARS Configuration Management Plan. JWARS users will be advised of anticipated changes in the supported hardware configuration as soon as possible to allow for procurement of enhancement hardware items.

3.2.2 Funding. The designation of the initial hardware configuration may necessitate some organizations to upgrade existing hardware or software items or acquire altogether new hardware and software. Additionally, users will require training on the new software. Funding responsibilities are discussed below.

3.2.2.1 Combatant Commands. The Combatant Commands are responsible for securing funding for hardware, software and training. They may request funds through the Joint Analytical Support Program (JASP) for specific items needed to upgrade existing configurations to meet the criteria for the initial configuration. J-8 will review all requests for funds and determine how best to allocate limited funds to equip the Combatant Commands with the minimum required configuration. Priority will be given to organizations performing testing. Upon release of funds, the Combatant Commands will take action to procure hardware and system software in time to permit installation of JWARS software and user training.

3.2.2.2 Other Organizations. Other organizations should begin planning to upgrade or acquire the hardware and support software for the approved configuration. Although only approved hardware configurations will be supported, users unable to upgrade hardware have the option to evaluate JWARS software with existing hardware to determine if satisfactory results are achievable. At the same time, organizations should pursue solutions to address hardware configuration deficiencies.

3.2.3 Training. The JWARS Office and J-8/SAMD will develop both the installation and training plans for JWARS. The JWARS Office, with assistance from J-8/SAMD and JDS, will conduct JWARS software installations and user training for test sites through Version 2. Upon release of the operational Version 1 for fielding, J-8/SAMD will lead initial site installations and training of non-test site personnel. This arrangement will allow the JWARS Office to focus on development and at the same time enable J-8/SAMD to develop the necessary expertise prior to full-time execution of installation, training, and help desk operations. JWARS users will be responsible for securing funding for travel and per diem for courses held at off-site locations.

3.2.3.1 JWARS User Profiles. The JWARS training requirements will vary between organizations depending on the number and capabilities of the organization's staff. To provide organizations with a baseline understanding of future JWARS staffing needs, and support development and selection of appropriate training curricula, three JWARS user profiles are defined in Table 3-2. These profiles describe an individual's capabilities and the functions that he

or she will be able to perform using JWARS. Training curricula will be designed to support users with these profiles.

Table 3-2. JWARS User Profiles

Profile	Description	Hardware and Software Tools
Analyst	Studies detailed simulation results. Can modify run parameters and select from pre-existing post-processing routines and reports. Limited to using existing scenarios and existing entities and objects. Has limited capability to modify the simulation. Duties will not involve programming or entity modeling.	Standard JWARS hardware configuration; JWARS executable software code and associated run-time environment
Entity Modeler	Can create whole new scenarios and extensively modify existing scenarios. Can create new entities, edit existing entities, edit attributes, change defaults, and locally register the entity. Can modify entities themselves by combining existing object classes, but cannot modify or create new object classes. Can modify or even create new post-processing reports.	Standard JWARS hardware configuration; JWARS executable software code and associated run-time environment
Developer	Can make changes to the code that runs the simulation. Unlimited in what they can do to the application: can create a domain object and change designing and programming. Can locally register default attributes, change default-attributes, register event types, and redefine event types.	Standard JWARS hardware configuration; JWARS source software code and associated development environment

3.2.3.2 Projected Course Offerings Projected JWARS training course offerings are listed in Table 3-3. In-depth courses for the three user profiles (analyst, entity modeler, and developer), an executive overview for senior managers, and JWARS-specific courses for system and database administrators are envisioned. Due to ongoing software development and system testing, only the Analyst and Executive Overview courses will be offered during the first year. Consistent with meeting the site installation schedule and resources available, additional requests for training will be accommodated. To facilitate scheduling, the lead-time for expressing such requests is four months. After Limited IOC, the frequency and location of these courses will be based on the requirements of the JWARS user community. JWARS training will cover operation of the simulation, data, and utility tools. Organizations must obtain prerequisite training for their personnel prior to attending JWARS training (see Table 3-3).

In addition to the courses, JWARS software and documentation will include tutorials, on-line references, manuals, and help sources to complement the JWARS training program.

Table 3-3. JWARS Training Courses

Course	Available	Objective	Length	Prerequisites
Executive Overview	1st Year (commencing with Version 1)	Provide high-level overview to senior officers	1/2 day	Senior M&S management position involving JWARS
Analyst	1st Year (commencing with Alpha Version)	Provide familiarization training. Train analysts in simulation execution, algorithms used in JWARS and scenario development	1 week	Background in operations research (e.g., service operations research/system analysis (OR/SA) from Naval Postgraduate School (NPS) or Air Force Institute of Technology (AFIT)); some joint or comparable experience, and 2 years working with analysis issues
Entity Modeler	2nd Year (commencing with Version 2)	Train entity modelers to create and simulate novel entities using JWARS built-in entity management features	1-2 week	Training in and experience with M&S systems; current or future position as entity modeler
Developer	2nd Year (commencing with Version 2)	Train developers to build entity models mapping to problem domains using computer programming languages used by JWARS	1-2 week	Training in and experience with the object-oriented languages used by JWARS

Course	Available	Objective	Length	Prerequisites
JWARS System Administrator	2nd Year (potentially)	Provide JWARS system administrators with both formal and hands-on training for supporting JWARS	2 days	Training in and experience with the operating systems used by JWARS (e.g., Sun/Solaris, HP/UX, IBM/AIX)
JWARS Database Administrator	2nd Year (potentially)	Provide JWARS database administrators with both formal and hands-on training for supporting JWARS	2 days	Training in and experience with the Database Management System (DBMS) used by JWARS

3.2.4 Testing. Centralized, local testing is less manpower intensive and more easily controlled than dispersed testing, but may provide less variety in testing conditions and a narrower viewpoint of the testers. Dispersed testing at user sites places an additional burden on operational activities, but spreads the workload across the in-place community, provides hands-on experience to operational users, and provides greater richness and verifiability in the test results. As resources allow, the latter will be pursued. Operational testing is necessary to ensure performance parameters are satisfied in a realistic, operational environment by planned users.

JWARS software versions will be tested by the developer, operational users at designated test sites, and an OPTEC System Team (OST) comprised of members of the Services' operational test and evaluation agencies and subject matter experts. The developer will test software during development of each version. Some operational users will participate in testing JWARS software for the purposes of providing early feedback to the JWARS Office, determining the simulation is performing as required, and building user familiarity and acceptance of JWARS. These operational user sites will be designated as test sites and are listed in Appendix B. Once selected, they are expected to continue to participate in testing throughout the entire JWARS life cycle. Only a limited number of test sites will be used for testing. These sites will receive the Alpha Version (Version 0.5) for evaluation. The Alpha Version will have only part of the Version 1 limited IOC functionality. As part of the development for Version 1, a beta version will be provided to allow users the opportunity to become familiar with the software, to informally test areas of particular interest to them within the software design, and to make recommendations to the developer for future changes. The OPTEC System Team will oversee operational testing of Version 1 and evaluate JWARS functionality and fulfillment of ORD requirements. Similarly, for Version 2 and Version 3, beta and operational testing will be conducted by the test sites and overseen by J-8/SAMD and the OST respectively. All testing will be in accordance with the Test and Evaluation Plan and will evaluate JWARS performance relative to requirements. The Test and Evaluation Plan will describe the database and parameters required for testing and evaluation. A memorandum of agreement with each test site will be developed to delineate testing commitments during all phases of testing (alpha, beta, operational). JDS-developed data, as well as user-supplied data, will be used for testing.

Upon installation of Version 1 and subsequent versions, operational users will perform on-site acceptance reviews and provide feedback to the JWARS Office. Operational users requesting modifications to the software will follow the procedures in the JWARS Configuration Management Plan.

JDS will provide the data files used for alpha testing. JDS, in coordination with the Services will develop and provide databases for beta and operational testing. The test sites will use these databases for testing. The users will conduct certification of databases. Data certification is an

official decision by the user that the data is acceptable with a model or simulation for a specific purpose or application.

3.2.5 Installation at User Sites. The JWARS Office, assisted by J-8/SAMD and JDS, will be responsible for installing JWARS at test sites and training test site personnel through Version 2. Site installations and training, for personnel at other than test sites, will be led by J-8/SAMD and begin after testing and any necessary changes are completed on Version 1.

3.2.6 Populating JWARS Databases. JWARS users will be able to populate their JWARS database by accessing the JDS repository and downloading a data subset (using a file-transfer program) using the Secret Internet Protocol Routing Network (SIPRNET). JDS will work with users to construct an initial database for use at the site. The data contained in the database will be selected based on the individual needs of each requesting organization. Users will be able to request data from JDS by completing a formatted data request on-line using SIPRNET. The JDS will update files as required. The security classification is expected to be system-high SECRET collateral. Sites are expected to share user-originated data with JDS.

3.3 Version 2. For Version 2, the sequence of activities will be similar to Version 1.

3.3.1 Configuration. The JWARS configuration will evolve over time due to both the advancement of computer technology and the further development of JWARS. Changes to the configuration will be accomplished as prescribed by the JWARS Configuration Management Plan, reference (g).

3.3.2 Funding. Limited JASP funds may continue to be available for initial hardware acquisition or upgrades to support transition requirements of the other (non-test site) Combatant Commands. Other DoD organizations should continue programming funding for hardware through their respective budget processes.

3.3.3 Training. Training courses will be updated to include the increased functionality and improvements expected during Version 2 development. The JWARS Office and J-8/SAMD will continue to support analyst profile and Executive Overview training courses. Commencing with Version 2, the training program is expected to expand to include training for personnel fitting the entity modeler and developer profiles and to provide training in areas such as JWARS system and database administration.

3.3.4 Testing. Beta and operational testing will be conducted on the Version 2 software.

3.3.5 Installation at User Sites. By the time of Version 2, many JWARS user sites should have an experienced on-site system administrator and experienced JWARS users. For this reason, consideration is being given to distributing JWARS for installation by the site system administrator on a compact disk-read only memory (CD-ROM), making it available from the JWARS web site (if the JWARS code is unclassified), or possibly making it available over SIPRNET. The ability to conduct CD-ROM installation or downloading the JWARS software from a web site may be made available for Version 1.

3.4 Version 3. The issues for Version 3 will be similar to those of Version 2. In addition, all program management responsibility will transfer from the JWARS Office to J-8/SAMD after Version 3 (FOC). All budgeting and funding responsibility for the Combatant Commands sites will rest with the parent command after initial site installations and training have occurred.

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4. TRANSITION PLANNING CONSIDERATIONS

Several factors affect the ability of an organization to move to a JWARS environment: funding for upgrades to or acquisitions of hardware and commercial off-the-shelf (COTS) software; accrediting JWARS for specific uses; migrating from legacy systems; and upgrading staff skills. Appendix A provides a plan for transition from TACWAR to JWARS. The JWARS user community may emulate this document for planning similar transitions of legacy simulations.

4.1 Funding. The Joint Analytic Model Improvement Program (JAMIP) will support the transition to JWARS. The planned continual decrease in funding for the operation of legacy simulations is expected to facilitate increased funding for transition to, and operation of, JWARS. Additionally, the Joint Analytical Support Program (JASP) provides for some limited support to supplement the Combatant Commands' transition to JWARS as discussed in section 3.

JAMIP support to legacy simulations such as TACWAR will continue until the following conditions are achieved:

- JWARS replaces the essential functionality of legacy simulations;
- JWARS is tested and shown to be a suitable replacement for the legacy simulation(s);
- Sufficient personnel are trained to use JWARS.

On a case-by-case basis, J-8 will consider providing JASP funds to the Combatant Commands for transition support, such as the following:

- Purchase of specific items necessary to bring computer platforms up to the minimal hardware configuration;
- On-site contractual support to support JWARS during the transition period.

The Services and other potential JWARS users that need to upgrade or acquire hardware and supporting software may need to shift assets, reprogram funds (e.g., from programs being replaced by JWARS), use operations and maintenance (O&M) funds, or request additional funds.

4.2 Accreditation of JWARS. Accreditation of a simulation is performed for a specific application. Accreditation is a two-step process involving (1) establishment of acceptability criteria and (2) review of verification and validation materials that result from the V&V process. Firstly, the user organization's accrediting authority establishes acceptability criteria tailored to the use for which JWARS is being considered. Secondly, the user organization's review must show that JWARS is able to address the essential elements of these criteria to prove its suitability to solve the problem at hand. This review determines the degree to which the simulation meets the previously established acceptability criteria. The DoD Verification, Validation, and Accreditation (VV&A) Recommended Practices Guide, reference (a) describes the process for verification, validation, and accreditation of JWARS models and simulations in general.

The V&V agent will design a Verification and Validation Plan, ensure its execution with support from Subject Matter Experts from the JUS and the OTA, and provide documented results to the user community. The results of V&V will aid users in their JWARS accreditation process. It is recommended that users schedule this event to permit timely retirement of legacy systems.

4.3 Migration from Legacy Systems. Certain legacy simulations will be replaced by JWARS. Each user site having one or more legacy system should consider data migration and parallel operation issues in making the transition to JWARS.

The issue of data migration may result from one or more of the following situations:

- Existing M&S systems may be using a database management system (DBMS) different from the one supporting JWARS.
- Legacy data (e.g., scenario data or setup data that drives the simulation) may require conversion.
- The JWARS database management system will have to be populated with data from JDS.

Users should plan for parallel operations during the transition period to ensure timely study completion and to allow for comparison of results between legacy systems and JWARS to support V&V, T&E, and the accreditation processes.

4.4 Upgrading Skills. JWARS user sites that will perform entity modeling and developer functions are responsible for ensuring that personnel performing these duties acquire the necessary prerequisite training. Users are responsible for providing their own training for the following areas:

- Object-oriented development concepts;
- Computer languages (e.g., Smalltalk);
- Software development tools (e.g., computer-aided software engineering (CASE) tools, graphical user interface (GUI) tools, DBMS tools);
- Operating systems (e.g., UNIX, NT).

5. INSTALLATION PLANNING

This section discusses installation planning pertinent to all JWARS users, including the actions required by the user sites and the resources needed to support the installation of JWARS.

5.1 Installation Overview. JWARS software will be installed during each program phase (i.e., Alpha, Version 1, 2, & 3). The essential difference for each installation is the version of software that will be installed and whether the site will participate in testing. Sites where JWARS software will be installed have been categorized as test and operational user. For the Alpha, Version 1 and Version 2, initial installations will be at test sites. These sites, a mixture of Combatant Commands, Services, and other agencies, were selected based on the needs and interests of the users and developers, the desire to conduct testing at a variety of sites, the expected JWARS functionality available in Versions 1 and 2, and the availability of funding. For follow-on installations, priority will be given to Combatant Commands and other current users of campaign-level analytical simulations to include OSD, Joint Staff, the Services, and other DoD agencies. Note that not all future JWARS users will require installation at Version 2. Some will not require installation until after Version 3, FOC, when the user-desired functionality is available. To facilitate installation and user training, the JWARS Office has stood up an External Support Team along with a Help Desk action line and email capability.

5.2 Installation Sites. An initial list of sites at which JWARS will be installed is identified in Appendix B, Table B-1. Additional sites may be added or order changed to facilitate testing and fielding. Order and priority of site installation will be determined with JAMIP Steering Committee approval. Estimated site installation time is approximately one week. Site installations may be conducted concurrently.

5.3 Tasks. The tasks associated with installing JWARS software requires the mutual cooperation of many organizations including J-8/SAMD, the JWARS Office, JDS, and the JWARS user community. Shown in Table 5-1 are the organizations with primary responsibility for the tasks listed. More than one organization is designated when multiple organizations share responsibility or when responsibility will shift between organizations during the life cycle of JWARS.

Table 5-1. Task Responsibilities

Task	J-8/SAMD	User Sites	JWARS Office	JDS
Fund installation and training of personnel	X	X	X	
Develop site installation checklist	X		X	
Plan and coordinate installation and training	X	X	X	X
Prepare the site (hardware, software, facilities)		X		
Ensure that site personnel meet training prerequisites		X		
Verify prerequisites for installation at user sites are fulfilled		X		
Identify site personnel requiring training		X		
Train the installation personnel	X		X	
Train the training instructors			X	
Prepare JWARS database for site		X	X	X
Install JWARS, provide training, database setup	X		X	X

5.3.1 Installation Information. Guidelines for the tasks to be accomplished before, during, and after installation of JWARS on the approved platforms are discussed in Appendix C.

5.3.2 Test Data. JDS, in conjunction with the JWARS Office, will provide the data to be used with the Alpha Version of the JWARS software. These data will be used to verify successful installation of JWARS at test sites and for alpha testing. For beta testing and for subsequent versions of JWARS, JDS will lead the development of databases. Test sites will support and participate in the development of the databases and associated scenarios with JDS. These databases will be used to support testing, acceptance review, troubleshooting, training, and execution of the JWARS simulation.

5.3.3 Installation Procedures. Detailed installation procedures, schedule, and checklists will be contained in the following: JWARS Installation Plan and Procedures document, reference (m), and the version description document/installation guide (VDDIG), reference (k). These documents will accompany each version of JWARS beginning with the Alpha Version.

5.4 Actions Required by User Sites. The following paragraphs discuss actions that user sites need to take before, during, and after installation of JWARS.

5.4.1 Before Installation of JWARS. User sites are required to take the following actions prior to installation of JWARS:

- Identify to J-8/SAMD a single point of contact for coordination of the installation;
- Acquire documentation for all hardware and support software necessary to support JWARS on the selected configuration;
- Acquire and install hardware end-items and component upgrades to bring platforms up to the level of one or more of the approved initial hardware configurations supported by JWARS;
- Acquire and install approved COTS and government off-the-shelf (GOTS) software products needed to support JWARS;
- Identify the site personnel for JWARS training to JWARS Office;
- Identify and satisfy security needs, including automated information system (AIS) media security, physical security, environmental security, information security (e.g., shielding, storage devices), communications security, and personnel security, as prescribed in Section 6;
- Prepare the site (e.g., construct vaults; install cabling, power, and/or air-conditioning);
- Identify user staff personnel profiles to J-8/SAMD (i.e. analyst, entity modeler, developer);
- Upgrade the skills of developers, system administrators, and database administrators with appropriate training identified in Section 4.4;
- Take necessary administrative actions (e.g., travel arrangements, security clearances sent) for personnel attending training;
- Make analysts available for JWARS training.¹

¹ Analyst training may also occur during or after installation.

5.4.2 During Installation of JWARS. User sites are required to take the following actions during installation of JWARS:

- Make system administrator and database administrator personnel available to provide assistance during installation of software and data.

5.4.3 After Installation of JWARS. User sites are required to take the following actions after installation of JWARS:

- Initialize user-specific data;
- Accredite the JWARS simulation for specific application use (see Section 4.2);
- Certify the data for specific application use;
- Conduct parallel operations with legacy systems as necessary;
- Retire legacy systems as feasible;
- Migrate existing database(s);
- Conduct user acceptance review;
- Provide feedback to the JWARS Office installation team.

5.5 Support Resources Required by User Sites. Each site must be prepared to support installation of JWARS, including facilities, hardware, software, data, and documentation. Resources needed are identified in the following paragraphs.

5.5.1 Support Facilities. JWARS will normally operate in an office environment within existing analytical centers, adhering to industry standards for power consumption, temperature, humidity conditions, and reduction of electromagnetic interference.

5.5.2 Hardware. JWARS should be installed on approved hardware configurations. Approved configurations are those that will be tested and certified for JWARS execution (to include at least one platform that meets shipboard deployability requirements). In addition to one of the approved hardware configurations, sites should possess documentation associated with each hardware item. For test sites, consideration should be given to installing the JWARS software on hardware that is independent of other critical applications. Hardware configurations originally described in the System Architecture paper will be updated in the JWARS Hardware and Software Specifications Document, reference (r). Additionally, the specific hardware configuration(s) that will be supported for each version of JWARS will be identified and specified in the applicable JWARS Installation Plan and Procedures.

5.5.3 Support Software. The support software needed for JWARS will be listed in the JWARS Hardware and Software Specifications Document, reference (r). User supplied support software needed for the Alpha version is identified in reference (m). Support software needed for Versions 1.0, 2.0, and 3.0 will be updated in the respective Installation Plan and Procedures and reference (r). When procuring support software, organizations should consider purchasing maintenance agreements that include software upgrades and help during installation and operation of the support software.

5.5.4 Data. A repository of certified data for JWARS will be maintained by JDS. Each site will coordinate with JDS when populating and maintaining JWARS database(s). Within the simulation, JWARS will incorporate a review-and-audit mechanism that activates whenever source data are modified. Audit trails built into JWARS will permit tracking of changes to source data, recording whom, when, how, and the delta between the source and the modified data.

5.5.5 Personnel. Each organization has different missions to fulfill and varying resources available to draw upon when determining JWARS usage and personnel staffing needs. To assist user organizations in determining future on-site JWARS staffing requirements, three profiles (analyst, entity modeler, developer) describing individual JWARS user capabilities and functions were defined (see section 3.2). A specific JWARS user organization may be staffed with a team of individuals possessing these profiles. Additional personnel performing system and database administrator functions may also be needed if not already at the site. The general types of personnel and skills needed to support JWARS at the user site are summarized in Table 5-2.

As Smalltalk, an object-oriented programming language, will be used for coding JWARS versions, personnel fulfilling the developer profile will need proficiency in this language. Based on the experience of the JWARS Office, a proficient C++ programmer, with knowledge of object-oriented methods, should be able to develop into an acceptable Smalltalk programmer by following the progression below:

- One-week beginner training (approximate cost \$1,800);
- On-the-job training/work for two or more weeks;
- One-week advanced training (approximate cost \$1,800);
- On-the-job training/work for two or more weeks;
- Desk-side mentoring (i.e., experienced mentor on-site for two weeks, reviews individual work);
- 45 days on-the-job training.

Table 5-2 JWARS Personnel Requirements

Type of Personnel	Skills	Representative Career Development Background	Recommended at Alpha	Recommended Version 1.0	Recommended Version 2.0	Recommended Version 3.0
Analyst	JWARS, Analysis, Scenario Development	Operations Research Analyst / Systems Analyst	X	X	X	X
Entity Modeler	JWARS, Entity Modeling	Operations Research Analyst / Systems Analyst			X	X
Developer	JWARS, UNIX, Object-oriented Programming (Smalltalk Language)	Software Engineer, Object-oriented Computer Programmer			X	X
Database Administrator	DBMS	Database Administrator	X	X	X	X
System Administrator	UNIX and/or NT	System Administrator	X	X	X	X

6. SECURITY

This section provides an overview of the security considerations associated with JWARS.

6.1 Security Overview. The JWARS Office will develop an ADP security plan for JWARS. The Information Security Program, reference (b), should be used as a guide for implementing appropriate controls to ensure Automated Information Security (AIS) media, physical, environmental, information, communications, and personnel security relating to JWARS. The ADP security plan will address the security accreditation process, documentation, and organization's responsibilities.

6.2 AIS Media Security. AIS media security involves the policies and procedures necessary to ensure the proper protection and marking of AIS media, to include magnetic media (e.g., tapes, diskettes) and optical storage media (e.g., CD-ROM). All media used to distribute and install JWARS will be screened for viruses and hidden files of a suspicious nature before installing the system. All AIS media will be marked with the appropriate security marking (e.g., classification level, classification authority, and declassification information) by the JWARS Office.

6.3 Physical Security. Each organization receiving JWARS is responsible for providing physical security appropriate to the classification of the hardware, software, data, and documentation.

6.4 Information Security. JWARS will require protection from unauthorized access and from information security (INFOSEC) threats as defined by the designated approval authority at each user site. JWARS data and storage devices normally will be SECRET. Higher classification levels may be required at certain sites. If required, user organizations will be responsible for annotating the display devices clearly indicating the classification of the hardware. The JWARS software should allow users to annotate the classification of the information on the display screen.

6.5 Personnel Security. The following personnel security issues need to be considered in fielding JWARS.

- User Sites. User personnel will require clearance to the highest classification that the system hosting JWARS will operate.
- Visit Requests. Installation team leaders will submit visit requests to commands scheduled to receive JWARS when coordinating for installation and training.
- Clearances. Installation team members will have security clearances appropriate for the site visited as well as the classification of the software and data. User sites will be notified of the security clearances of team members when the visit request is submitted.

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Appendix A

TACWAR Integrated Environment (TIE) Transition Plan

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A.1 TACWAR Transition Plan. This appendix provides guidance for the joint analytical community's plan to transition from the use of the Tactical Warfare (TACWAR) Integrated Environment (TIE) to the Joint Warfare System (JWARS). The TACWAR Configuration Control Committee (CCC) will update the plan as necessary. It has been included as an appendix within the JWARS Fielding Plan to serve as a guide for the development of other legacy simulation transition plans.

A.2 Background. TACWAR, a commonly used campaign level simulation, was developed in the mid-70's by the Institute for Defense Analysis. It was first brought in-house at J-8 in 1985. Since that time, the simulation has found wide usage and been a valuable tool throughout the joint analysis community. Current users include the Joint Staff/J-8, OSD, US Central Command (CENTCOM), US Forces Korea (USFK), Chief of Naval Operations (OPNAV N81), TRADOC Analysis Center (TRAC), Center for Army Analysis (CAA), US Atlantic Command (USACOM), and other service and joint components.

Although the TIE has proven to be a valuable tool and has undergone extensive enhancements over the past several years, there are several reasons that the simulation should be phased out. The technology upon which TACWAR is based is old and will not support the DoD-mandated standards for High Level Architecture (HLA). Additionally, use of the TACWAR is manpower intensive. Furthermore, in some cases the user must accept less than desirable modeling of some aspects of warfare. JWARS is the planned replacement for legacy simulations such as the TIE.

JWARS development began with a set of simulation requirements provided by all services and the Combatant Commands. It is being developed as a segment of the Joint Analytical Model Improvement Program (JAMIP) and will satisfy the mid-to-far-term requirements of the improvement program. The purpose of JWARS is to support joint warfare analysis, primarily at the theater campaign level.

A.3 Level of Support. JAMIP will continue to support TIE until JWARS functionality meets the guidelines discussed in the following section. Once the guidelines are achieved, the TIE will no longer be supported by J-8. In the interim period, the level of support to TIE is expected to gradually decrease as support to JWARS begins to ramp up. During this interim period, J-8/SAMD will continue to support TIE configuration management, Help Desk, and software distribution of maintenance versions of TIE. The TACWAR Configuration Control Committee (CCC) will be dissolved at the direction of the J-8, Deputy Director for Wargaming, Simulation, and Analysis (DDWSA).

A.4 Criteria. The following guidelines are provided to ensure that TIE users maintain the capability to meet current capabilities provided by TIE during the transition period from TIE to JWARS. TIE will continue to be supported until the following guidelines are met:

- Existing TACWAR users supported by the JAMIP have been trained and acquired experience in the use of JWARS.
- JWARS has achieved replacement functionality as described by the ORD for Full IOC, Version 2.
- JWARS has been accredited for joint warfare analysis at the theater campaign level.

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Appendix B

Installation Site Details

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B.1 Installation Sites. Table B-1 is a list of the organizations that intend to use JWARS and the forecast site locations. The list is based in part on information gathered from organizations that responded to a J-8 Deputy Director for Wargaming, Simulation and Operations (DDWSO) Request for Information survey, reference (e), and a J-8 memo requesting organizations identify user sites for JWARS reference (n). Information within the table includes: “Organization/Site Location, “Type of Site” (i.e., test or operational user), “Installation Date”, “Installation Order”, “Type of Software” (i.e., whether sites expect to use executable or development software), and “Current Hardware” (i.e., the type of hardware that exists, or which will soon exist at the organization). Priority for installation will be given to test sites, followed by Combatant Commands and other current users of campaign-level analytical simulations to include OSD, the Joint Staff, the Services, and other DoD agencies. Note the list is focused toward achievement of Full IOC, Version 2. It is for planning purposes only, and will be updated, as additional information becomes available. Organizations are requested to forward updates to J-8/SAMD, as they become available.

Table B-1. Installation Sites

Organization/Site Location	Type of Site ¹	Installation Date	Installation Order ²	Type of Software ³	Current Hardware ⁴
ACOM	U	Post Full IOC	TBD	E	Sun
CENTCOM	T	Mar 99	9	E	Sun
EUCOM	U	Post Full IOC	TBD	E	Sun, SGI
PACOM	T	Mar 99	11	D	Sun
CFC-Korea	T	Mar 99	12	E	Sun
SOCOM	T	Mar 99	8	E	Sun
SOUTHCOM	U	Post Full IOC	TBD	E	Sun, HP
SPACECOM	U	FOC	TBD	E	SGI
STRATCOM	U	FOC	TBD	E	Sun, SGI
TRANSCOM	T	Mar 99	10	E	Sun
Joint Staff ⁵	T	Jan 99	2	D	Sun, SGI, HP
TRAC-FLVN Leavenworth	T	Feb 99	6	D	Sun, HP
Joint Warfare Analysis Center	U	Post Full IOC	TBD	E	Sun, SGI
Joint Command and Control Warfare Center (SIS)	U	Post Full IOC	TBD	E	Sun
OSD PA&E Simulation Analysis Center (SAC)	T	Dec 98	1	D	Sun, SGI
OASD(C3I)/CISA	U	Post Full IOC	TBD	E	Sun, SGI
OSD PA&E (JDS)	U	Post Full IOC	TBD	E	Sun
OSD PA&E (Projection Forces)	U	Post Full IOC	TBD	E	Sun
Ballistic Missile Defense Organization	U	Post Full IOC	TBD	D	Sun, SGI
Defense Information Systems Agency (D8)	U	Post Full IOC	TBD	E	Sun, SGI
Defense Intelligence Agency (DI-FSM)	U	Post Full IOC	TBD	E	Sun
DoD Space Architect	U	Post Full IOC	TBD	E	Sun, SGI
Logistics Management Center	U	Post Full IOC	TBD	D	Sun
Air Force Institute of Technology	U	Post Full IOC	TBD	E	Sun, SGI
Air Force Space Warfare Center	U	Post Full IOC	TBD	E	Sun, SGI, HP,

¹ Type of Site: (T) Test Site, (U) Operational User Site not participating in testing.

² Installation Order. 12 sites will participate in alpha, beta, and operational testing.

³ Type of Software: (E) Executable code only—intended for use by analysts and entity modelers, (D) Source Code (along with executable code) as a form of documentation will be made available to the Test Sites at Alpha release and subsequent iterations. To facilitate the learning process, users may request a copy of the actual source code that can be navigated and manipulated with the appropriate software (e.g., Visual Age to be acquired by the Test Site). In order not to interfere with development, a “No Questions Asked” policy will be instituted for users receiving the actual code. That is, users who receive actual source code prior to the Version 1.0 beta will not be allowed to seek help (regarding the actual source code) from the JWARS Office, developers, or Help Desk. With release of Version 1.0 beta, the Help Desk will serve as the focal point for all questions regarding code. The JWARS Office does not provide training on Smalltalk.

⁴ Hardware: Sun=Sun Microsystems; SGI= Silicon Graphics, Inc.; HP=Hewlett-Packard; IBM=International Business Machines.

⁵ Joint Staff site will be a combined J-2, J-4, J-6, J-8 test site.

Organization/Site Location	Type of Site ¹	Installation Date	Installation Order ²	Type of Software ³	Current Hardware ⁴
					IBM
USAF, Air Force Studies and Analysis Agency (AFSAA)	T	Feb 99	3	D	Sun
Air Force Wargaming Institute	U	Post Full IOC	TBD	E	Sun, SGI
Air Mobility Command	U	Post Full IOC	TBD	E	Sun
USAF, HQ Air Combat Command (XP-SAS)	U	Post FOC	TBD	E	TBD
USAF, Air Force Material Command (AFMC) (XP-AO)	U	Post FOC	TBD	E	TBD
USAF, Aeronautical Systems Center (ASC) XRA	U	Post FOC	TBD	E	TBD
USAF, Aeronautical Systems Center (ASC) XRE	U	Post FOC	TBD	E	TBD
USAF, HQ USAF (XPY)	U	Post FOC	TBD	E	TBD
USAF, DET 1, 31 Test and Evaluation Squadron	U	Post FOC	TBD	E	TBD
USAF, Electronic Systems Center (XRP)	U	Post FOC	TBD	E	TBD
USAF, Space & Missile Systems Center, Development Planning Directorate (XRFp)	U	Post FOC	TBD	E	TBD
USAF, Space Warfare Center, Analysis and Engineering	U	Post FOC	TBD	E	TBD
USAF, 68th Test Support Squadron	U	Post FOC	TBD	E	TBD
USAF, 96 Comm Group (SCTOS)	U	Post FOC	TBD	E	TBD
USAF, Joint Strike Fighter Program Office	U	Post FOC	TBD	E	TBD
Center for Army Analysis (CAA)	T	Feb 99	4	D	Sun, SGI, HP, IBM
Ft Benning Dismounted Battlespace Battlelab	U	Post FOC	TBD	E	HP
Ft Benning Land Warrior Test Bed	U	Post FOC	TBD	E	Sun, SGI
Ft Bliss Warfighting Center	U	Post FOC	TBD	E	Sun, SGI, HP
Ft Bragg Concept Development Command	U	Post FOC	TBD	E	Sun
Ft Hood Battle Simulation System	U	Post FOC	TBD	E	Sun, SGI
Ft Knox Mounted Warfare Test Bed	U	Post FOC	TBD	E	Sun, SGI, HP
Ft Knox MWTB STRICOM Core DIS Facility	U	Post FOC	TBD	E	Sun, SGI
Ft Leonard Wood Engineer Force Simulation Center	U	Post FOC	TBD	E	Sun, SGI, HP
I Corps and Ft Lewis Battle Simulation Center	U	Post FOC	TBD	E	HP
Ft Polk Battle Simulation Center	U	Post FOC	TBD	E	Other
Ft Sill, Field Artillery School	U	Post FOC	TBD	E	Sun, SGI
HQ FORSCOM	U	Post Full IOC	TBD	E	Sun
HQ STRICOM	U	Post FOC	TBD	E	Sun, IBM
Marine Corps Combat Development Center (MCCDC)	T	Feb 99	7	E	Sun
Military Traffic Management Command, Newport News	U	Post Full IOC	TBD	E	Sun
XVIII Airborne Corps Battle Simulation Center	U	Post Full IOC	TBD	E	Other
N81-Systems Planning & Analysis, Inc., Alexandria	U	Post Full IOC	TBD	E	Sun, HP
N81 (OPNAV)-CNO, OPNAV N812	T	Feb99	5	D	Sun, HP
N81 (OPNAV) - NPS C3 Dept., Monterey	U	Post Full IOC	TBD	E	Sun, SGI, HP
N81 (OPNAV)-CINCPACFLT, N64	U	Post Full IOC	TBD	E	HP
N81 (OPNAV) Naval Air Warfare Center Pax River	U	Post Full IOC	TBD	E	Sun, SGI, HP
Naval Air Warfare Center, China Lake	U	Post Full IOC	TBD	E	SGI, HP
Coastal Systems Division, A05M, Panama City	U	Post Full IOC	TBD	E	SGI, HP
Naval Postgraduate School (OR Dept.), Monterey	U	Post Full IOC	TBD	E	Sun
Naval Research Laboratory, Washington, DC	U	Post Full IOC	TBD	E	SGI
Naval Surface Weapons Center, Carderock	U	Post Full IOC	TBD	E	SGI
Naval Undersea Warfare Center, Newport	U	Post Full IOC	TBD	E	SGI, HP
Naval War College, Newport	U	Post Full IOC	TBD	E	Sun, SGI, HP

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Appendix C

Installation Procedure Details

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C.1 JWARS Documentation. Table C-1 shows the JWARS documentation needed for JWARS installation and training.

Table C-1. JWARS Documentation

Document	Need for Installation	Need for Training
Software User's Manual (SUM)	Ö	Ö
Software Test Description (STD)	Ö	
Software Test Report (STR)	Ö	
JWARS Installation Plan and Procedures	Ö	Ö
Version Description Document/Installation Guide (VDDIG)	Ö	
Configuration Management Plan	Ö	
Fielding Plan	Ö	
Training Plan		Ö
Test and Evaluation Plan	Ö	

C.2 Installation Procedures, Schedule, and Checklists. A JWARS Installation Plan and Procedures document will be published for each major version of JWARS to include the Alpha, Version 1, Version 2 and Version 3 (e.g., for the JWARS Alpha Version see reference (m)). The detailed installation plan will include specific dates and information on the following subjects:

- Site installation schedule
- User site responsibilities
- Installation team responsibilities
- Hardware configuration
- Support software requirements
- Pre-installation procedures
- Installation procedures
- User site software change/trouble report formats

Detailed procedures for installing the JWARS software will be contained in the JWARS Installation Plan and Procedures, reference (m). These procedures will include information on the following subjects:

- Installing the software;
- Checking software after installation;
- Initializing databases and other software with test data;
- Dry-running the procedures in operator and user manuals;
- Executing trial runs using developmental or certified data.

Appendix D

List of References

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List of References

D.1 Department of Defense (DoD) and Joint Staff.

- a. DoD Verification, Validation, and Accreditation (VV&A) Recommended Practices Guide, Defense Modeling and Simulation Office, November 1996.
- b. Information Security Program Regulation, DoD 5200.1-R, Jan 1997.
- c. Verification, Validation, and Accreditation (VV&A) of Models and Simulations, Joint Staff Instruction 8104.01, 12 January 1995.

D.2 JWARS Documents

- d. Joint Warfare System (JWARS), Operational Requirements Document (ORD), 27 August 1998.
- e. Joint Warfare System (JWARS) - Request for Information, J-8 A00064-97, The Joint Staff/J-8, Deputy Director for Wargaming, Simulation and Operations, 27 January 1997 (Hardware Survey).
- f. JWARS Initial Operational Capability (IOC) Hardware Design-to Criteria, The Joint Staff/J-8, Deputy Director for Wargaming, Simulation and Operations, 14 April 1997.
- g. Joint Warfare System (JWARS) Configuration Management Plan Version 1.5, The Joint Staff/J-8/Studies and Analysis Management Division (SAMD), 25 November 1998.
- h. Joint Warfare System (JWARS) Management Plan, JWARS Office, Office of the Director, Program Analysis and Evaluation, Office of the Secretary of Defense, 26 August 1996.
- i. The Joint Warfare System High Level Design System Architecture, JWARS Office, Office of the Director, Program Analysis and Evaluation, Office of the Secretary of Defense, September 24, 1996.
- j. Joint Warfare System (JWARS) Overview Briefing, JWARS Office, Office of the Director, Program Analysis and Evaluation, Office of the Secretary of Defense, Version 4.0, 26 August 1998.
- k. Joint Warfare System (JWARS) Verification and Validation (V&V) Plan Version 3.0, 13 August 1998.
- l. Joint Warfare System (JWARS) Automated Security Plan, (TBD).

- m. Joint Warfare System (JWARS) Alpha Installation Plan and Procedures Version 0.9, (draft) 20 October 1998.
- n. J-8 Memo, Identification of Using Sites for the Joint Warfare System (JWARS) and Appointment of JWARS Configuration Control Board (CCB) Members, J-8A 00152-98, 26 February 1998
- o. Joint Warfare System (JWARS) Help Desk Guide Version 1.1, The Joint Staff/J-8/Studies and Analysis Management Division (SAMD), 24 November 1998.
- p. Joint Warfare System (JWARS) Analyst User Manual, JWARS Office, Office of the Director, Program Analysis and Evaluation, Office of the Secretary of Defense, Version 0.8, (draft) 30 October 1998.
- q. Joint Warfare System (JWARS) Version 1 Installation Plan and Procedures, TBD.
- r. Joint Warfare System (JWARS) Hardware and Software Specifications Document, estimated publication date January 1999.

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Appendix E
Acronyms and Terms

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Acronyms

AIS	Automated Information System
C4	Command, Control, Communications, and Computers
CASE	Computer Aided Software Engineering
CD-ROM	Compact Disk Read Only Memory
CM	Configuration Management
COTS	Commercial Off-The-Shelf
DA	Development Agent
DBMS	Database Management System
DMSO	Defense Modeling and Simulation Office
DoD	Department of Defense
EXCIMS	Executive Council for Modeling and Simulation
FOC	Full Operational Capability
GOTS	Government Off-The-Shelf
HLA	High Level Architecture
INFOSEC	Information Security
IOC	Initial Operational Capability
ISR	Intelligence, Surveillance, and Reconnaissance
JAMIP	Joint Analytic Model Improvement Program
JASP	Joint Analytical Support Program
JCMMS	Joint Conceptual Model of the Mission Space
JDS	Joint Data Support
JUS	JWARS Users Subgroups
JWARS	Joint Warfare System
ORD	Operational Requirements Document
OSD	Office of the Secretary of Defense
OST	OPTEC System Team
OTA	Operational Test Agent
SAMD	Studies and Analysis Management Division
SIPRNET	Secret Internet Protocol Routing Network
TACWAR	Tactical Warfare Model
TBD	To Be Determined
TRAC-FLVNTRADOC	Analysis Center, Fort Leavenworth
V&V	Verification and Validation
VDDIG	Version Description Document Installation Guide
VV&A	Verification, Validation, and Accreditation
VV&C	Verification, Validation, and Certification

Terms

alpha testing. Testing of partial software developments that is performed by a relatively small number of users or potential users of the software. The organization performing the testing does not normally have a primary responsibility for testing (i.e. a test organization). Purpose is to provide early feedback to the software developer by the future users. Testing may be structured to take advantage of the strengths and characteristics of the tester (e.g., a specific thread examined by a specific user).

analyst profile. One of three profiles for a JWARS user. A person matching the analyst profile studies detailed simulation results, modifies simulation run parameters and selects from pre-existing post-processing routines and reports. The person is limited to using existing scenarios and existing entities and objects and has limited capability to modify the simulation. The individual fitting the analyst profile will not directly be involved in coding, programming, or entity modeling.

beta testing. Testing of software development versions performed by analytical organizations that are users or potential users of the code being tested. Testing provides users the opportunity to become familiar the software, to informally test areas of particular interest to them within the software design, and to make recommendations to the developer for future changes.

developer profile. One of three profiles for a JWARS user. A person matching the developer profile can make modifications to the simulation code. The individual can create a domain object and change designing and programming, locally register default attributes, change default attributes, register event types, and redefine event types.

development environment. A set of tools used in the design and implementation phases of a project. Common tools are compilers, editors, debugging tools, and change control systems.

domain. A coherent body of knowledge, rules, and definitions related to a particular subject.

entity. A collection of objects that together describe a real-world actor.

entity modeler profile. One of three profiles for a JWARS user. A person matching the entity modeler profile can create whole new scenarios and extensively modify existing scenarios, as well as create new entities, edit existing entities, edit attributes, change defaults, and locally register the entity. The individual can also modify entities themselves by combining existing object classes, but cannot modify or create new object classes. The entity modeler will also be able to modify or even create new post-processing reports.

fielding. The process of placing a component, system, or platform in the “field” for employment by the operational users.

Full Initial Operational Capability (IOC). Full IOC is intended to support Planning and Execution studies and Force Assessment studies. Full IOC shall occur when at least one JWARS operational site is capable of supporting Planning and Execution studies and at least one JWARS operational site is capable of supporting Force Assessment studies. Full IOC (including installation, training, testing, and test modifications) shall occur not later than May 1, 2001.

Full Operational Capability (FOC). FOC is intended to support Planning and Execution studies, Force Assessment studies, System Effectiveness and Trade-off studies, and Concept and Doctrine Development studies. FOC shall occur when at least one JWARS operational site is capable of supporting System Effectiveness and Trade-off studies and at least one JWARS operational site is capable of supporting Concept and Doctrine Development studies. FOC (including installation, training, testing, and test modifications) is anticipated in FY02.

High Level Architecture (HLA). A common technical framework being defined under the leadership of the Defense Modeling and Simulation Office (DMSO) to which models and simulations must conform. The HLA baseline is defined by current versions of the HLA Rules, the HLA Interface Specification, and the HLA Object Model Template. The HLA explicitly addresses interoperability among simulations within a single federation, though not interoperability between distinct federations.

Joint Conceptual Model of the Mission Space (JCMMS). The JCMMS is developed from the JM&SRG requirements and the scenarios, partitions, and use cases (which are identified by the JUG to drive development).

Limited Initial Operational Capability (IOC). Limited IOC is intended to support early operational testing and evaluation of JWARS and to replace the use of TACWAR to support Force Assessment studies. Limited IOC shall occur when at least one JWARS operational site is capable of replacing the use of TACWAR to support Force Assessment studies. Limited IOC (including installation, training, testing, and test modifications) shall occur not later than March 1, 2000.

object. Description of a set of behaviors and the information (data and methods) needed to support the behaviors.

object model. A model identifying classes, their responsibilities, and their static relationships, often represented by a diagram plus supporting documentation.

operational baseline. The baseline resulting from government testing (i.e., beta testing and operational testing) of the product baseline and subsequent version to the user for operational use.

operational test and evaluation. Operational testing of software development versions led by operational test and evaluation organizations to determine how operationally effective, suitable, and survivable systems are before delivery to the intended users.

operational user site. A CINC, Service, or other DoD site where JWARS will be installed.

scenario. A description of a military problem that provides the political and military background, describes the military mission and resources in general terms, and establishes the framework for analysis; an elaboration of a use case into a precisely defined statement of system behavior.

test site. An operational user site that participates in alpha, beta, and operational testing of JWARS.

thread. A unit of development work. A low-level definition of software functionality required to represent a joint warfare function or process; sized to permit development by a software development team and to facilitate scheduling; small, discrete units of software that describe a logically complete software development requirement; different threads are logically independent of each other.

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US Air Force, ATTN: XOC
US Army, ATTN: DAMO-ZD
US Marine Corps, ATTN: MCCDC
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Commander in Chief, US Atlantic Command, ATTN.: J-73
Commander in Chief, US Central Command, ATTN.: CCCA
Commander in Chief, US European Command, ATTN.: ECCS-AS
Commander in Chief, US Pacific Command, ATTN.: J-081
Commander in Chief, US Space Command, ATTN.: (N-SPAN)
Commander in Chief, US Special Operations Command, ATTN.: SOJ7-C
Commander in Chief, US Southern Command, ATTN.: SCJ5-PAS
Commander in Chief, US Strategic Command, ATTN.: J53
Commander in Chief, US Transportation Command, ATTN.: TCJ5
USFK/Combined Forces Command - Korea, ATTN.: FKJ3-PL-OA
Director for Intelligence, J-2, ATTN.: J-2P
Director for Logistics, J-4, ATTN.: MD
Director for Command, Control, Communications, and Computer Systems, J-6, ATTN.: J-6I
Director for Force Structure, Resources, and Assessment, J-8, ATTN.: WAD
Defense Intelligence Agency, ATTN: DIFSM
Office of the Director, Program, Analysis & Evaluation, SAC, JWARS Office, Joint Data System